BMP #39 - Vegetative Filter Strip

Targeted Pollutants

50% Sediment

50% Phosphorus

◕ Trace metals

○ Bacteria

◕ Petroleum hydrocarbons

Physical Limits

Drainage area   5 ac

Max slope   14%

Min bedrock depth   5 feet

Min water table   3 feet

SCS soil type   BCD

Freeze/Thaw   fair

Drainage/Flood control   no

DESCRIPTION

A vegetated filter strip is a band of vegetation located between a pollutant source (such as a parking lot) and a stream, pond, or wetland. The key to a successfully functioning filter strip are the use of dense vegetation (typically grass) and allowing only overland sheet flow to cross the strip, avoiding concentrated flows.

Application and Limitations

A vegetative filter strip is designed to provide runoff treatment of conventional pollutants but not nutrients. Also, unlike a biofiltration swale, a vegetative filter strip should not be used for conveyance of larger storms because of the need to maintain sheet flow conditions, plus the filter strip would likely be prohibitively large for this application.

Vegetative filter strips can be effective at pre-treating runoff to protect filtration BMPs from siltation. It may also be a viable treatment measure for small, less intensely developed sites. The maximum recommended drainage area for a vegetative filter strip is 5 acres (2 hectares).

Vegetative filter strips must not receive concentrated flow discharges as their effectiveness will be destroyed plus the potential for erosion could cause filter strips to become sources of pollution.

Slope. Vegetative filter strips should not be used on slopes greater than 10 percent because of the difficulty in maintaining the necessary sheet flow conditions. Note: This does not mean that vegetated buffers are not suitable for slopes greater than 10 percent; it simply means that effective treatment of runoff is unlikely for slopes greater than 10 percent. Do not confuse a "buffer zone," which is used to protect streams and other environmental resources with a "vegetative filter strip," which is a runoff treatment measure.

Design Parameters

Criteria has been developed to ensure that a residence time of 20 minutes for the water as it flows across (perpendicular to) the strip. Complete details of the criteria are given below. Also, Appendix G-1 provides step-by-step procedures for designing both vegetation strips and biofiltration swales

General Criteria

See BMP #38a—Biofiltration Swale.

Specific Criteria for Vegetative Filter Strips

1. Design vegetative filter strips according to the same method detailed for vegetated swales (BMP #38). Calculate the necessary filter strip width (perpendicular to flow) on the basis of the water

quality design storm (1/3 of the 2-year event) and a hydraulic radius (R) approximately equal to the design flow depth (y). Note: The design flow depth (y) will normally be no more than 0.5" (12.77 mm) because of the need to maintain sheet flow over the strip).

1. Calculate the necessary length (parallel to flow) to produce a water residence time of at least 20 minutes and a velocity of 0.5 fps (0.15 m/sec) or less. The length should normally be in the range of 100-200 feet (30 to 60 meters). A minimum of 25 feet (7.6 meters) is required.

1. Install a shallow stone trench across the top of the strip to serve as a level spreader or make use of curb cuts in a parking lot. Make provisions to avoid flow bypassing the filter strip.
2. Vegetative filter strips should not normally be used for slopes in excess of 10 percent, and preferably less, because of the difficulty in maintaining the necessary sheet flow conditions.
3. The flow length of the area draining to the filter strip should be 75 feet (23 meters) or less for impervious surfaces and 150 feet (46 meters) or less for pervious areas.

1. If necessary, filter strips should be fenced to keep vehicles, pedestrians, and animals out.

Construction Guidelines

See BMP #38a—Biofiltration Swale.

Maintenance

See BMP #38a—Biofiltration Swale.